
CONTENTS

SUMMARY.....	i
UNIT CONVERSION TABLE.....	xxxix
ACRONYMS AND ABBREVIATIONS.....	xI
1.0 INTRODUCTION	1-1
1.1 Background	1-1
1.2 Purpose and Need.....	1-2
1.2.1 Purpose and Need for the Proposed Action (Buried Pipeline).....	1-2
1.2.2 Purpose and Need for the Supplemental EIS.....	1-2
1.3 Issues	1-2
1.4 Description of Barrick's Continuing Operations.....	1-10
1.4.1 Location and Land Ownership	1-10
1.4.2 Mining, Milling, and Beneficiation Operations.....	1-10
1.4.2.1 Betze -Post Mine	1-13
1.4.2.2 Meikle Mine.....	1-15
1.4.2.3 Rodeo and Goldbug Exploration.....	1-15
1.4.2.4 Heap Leach Facilities.....	1-15
1.4.2.5 Milling and Beneficiation Facilities	1-15
1.4.3 Water Management Operations	1-16
1.4.3.1 Wells and Collection System.....	1-17
1.4.3.2 TS Ranch Reservoir.....	1-18
1.4.3.3 Springs and Sand Dune Canal.....	1-20
1.4.3.4 Irrigation in Boulder Valley	1-20
1.4.3.5 Infiltration	1-22
1.4.3.6 Injection	1-22
1.4.3.7 Sand Dune Drainage Embankments.....	1-22
1.4.3.8 Humboldt River Discharge	1-23
1.4.3.9 Monitoring	1-24
1.4.3.10 Water Management Plans	1-24
1.5 Water Management Alternatives	1-25
1.5.1 Additional Irrigation	1-25
1.5.2 Additional Infiltration or Injection	1-25
1.5.3 Discharge to Other Surface Waters	1-25
1.5.4 Other Water Uses.....	1-26
1.6 Existing Mitigation Commitments - Betze Record of Decision	1-26
1.6.1 Monitoring Programs.....	1-26
1.6.2 Mitigation Measures.....	1-27
1.7 Interrelated Projects.....	1-27

CONTENTS (Cont'd)

1.7.1	Water Management Operations	1-28
1.7.1.1	Mining Operations.....	1-28
1.7.1.2	Other Projects and Activities	1-34
1.7.2	Proposed Action	1-34
1.8	Relationship to Policies, Programs, and Plans.....	1-34
1.9	Organization of this Supplemental EIS	1-35
2.0	PROPOSED ACTION AND ALTERNATIVES	2-1
2.1	Proposed Action (Buried Pipeline).....	2-1
2.2	Alternatives to the Proposed Action (No Action).....	2-1
2.3	Alternatives Considered but Eliminated from Detailed Analysis	2-1
2.4	Agency Preferred Alternative	2-3
3.0	AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES FOR WATER MANAGEMENT OPERATIONS	3-1
3.1	Geology.....	3-3
3.1.1	Affected Environment.....	3-3
3.1.1.1	Physiographic and Topographic Setting	3-3
3.1.1.2	Regional and Geographic Setting	3-3
3.1.1.3	Faulting and Seismicity.....	3-10
3.1.2	Environmental Consequences.....	3-14
3.1.2.1	Impacts from Mine Dewatering and Localized Water Management Activities	3-14
3.1.2.2	Impacts to the Humboldt River	3-20
3.1.3	Monitoring and Mitigation	3-20
3.1.4	Residual Impacts	3-20
3.1.5	Irreversible and Irretrievable Commitment of Resources	3-20
3.2	Water Resources and Geochemistry.....	3-21
3.2.1	Affected Environment.....	3-21
3.2.1.1	Introduction	3-21
3.2.1.2	Hydrologic Study Area for Dewatering and Localized Water Management Activities	3-27
3.2.1.3	Humboldt River Study Area	3-57
3.2.2	Environmental Consequences	3-81
3.2.2.1	Impacts from Mine Dewatering and Localized Water Management Activities	3-82
3.2.2.2	Impacts to the Humboldt River	3-116
3.2.3	Monitoring and Mitigation	3-136
3.2.3.1	Mine Dewatering and Localized Water Management Activities	3-136
3.2.3.2	Humboldt River Monitoring and Mitigation Measures	3-139

CONTENTS (Cont'd)

3.2.4	Residual Effects	3-140
3.2.4.1	Mine Dewatering and Localized Water Management Activities	3-140
3.2.4.2	Residual Effects to the Humboldt River	3-140
3.2.5	Irreversible and Irrecoverable Commitment of Resources	3-140
3.3	Riparian Vegetation	3-142
3.3.1	Affected Environment.....	3-142
3.3.1.1	Study Area for Mine Dewatering and Localized Water Management Activities	3-142
3.3.1.2	Humboldt River Study Area.....	3-151
3.3.2	Environmental Consequences	3-153
3.3.2.1	Impacts from Mine Dewatering and Localized Water Management Activities	3-153
3.3.2.2	Impacts to the Humboldt River	3-154
3.3.3	Monitoring and Mitigation	3-156
3.3.4	Residual Effects	3-157
3.3.5	Irreversible and Irrecoverable Commitment of Resources	3-157
3.4	Terrestrial Wildlife	3-158
3.4.1	Affected Environment.....	3-158
3.4.1.1	Habitat	3-158
3.4.1.2	Game Species.....	3-162
3.4.1.3	Nongame Species	3-168
3.4.2	Environmental Consequences	3-170
3.4.2.1	Overview.....	3-170
3.4.2.2	Impacts from Mine Dewatering and Localized Water Management Activities	3-171
3.4.2.3	Impacts Associated with the Pit Lake	3-175
3.4.2.4	Impacts to the Humboldt River	3-176
3.4.2.5	Impacts to the Humboldt Sink.....	3-178
3.4.3	Monitoring and Mitigation	3-187
3.4.4	Residual Effects	3-187
3.4.5	Irreversible and Irrecoverable Commitment of Resources	3-187
3.5	Aquatic Resources	3-188
3.5.1	Affected Environment.....	3-188
3.5.1.1	Boulder Creek Subbasin.....	3-188
3.5.1.2	Maggie Creek Subbasin	3-188
3.5.1.3	Rock Creek Subbasin	3-190
3.5.1.4	Humboldt River Basin	3-191
3.5.2	Environmental Consequences	3-193
3.5.2.1	Impacts from Mine Dewatering and Localized Water Management Activities	3-193

CONTENTS (Cont'd)

3.5.2.2	Impacts to the Humboldt River	3-193
3.5.3	Monitoring and Mitigation	3-195
3.5.4	Residual Impacts	3-195
3.5.5	Irreversible and Irrecoverable Commitment of Resources	3-195
3.6	Threatened, Endangered, Candidate, and Sensitive Species	3-196
3.6.1	Affected Environment.....	3-196
3.6.1.1	Terrestrial Species.....	3-196
3.6.1.2	Aquatic Species.....	3-202
3.6.2	Environmental Consequences	3-210
3.6.2.1	Terrestrial Species.....	3-210
3.6.2.2	Aquatic Species.....	3-215
3.6.3	Monitoring and Mitigation	3-216
3.6.3.1	Sage Grouse	3-216
3.6.3.2	Spotted Frog	3-216
3.6.3.3	Springsnails	3-216
3.6.4	Residual Effects	3-217
3.6.5	Irreversible and Irrecoverable Commitment of Resources	3-217
3.7	Grazing Management	3-218
3.7.1	Affected Environment.....	3-218
3.7.2	Environmental Consequences	3-221
3.7.2.1	Impacts from Mine Dewatering and Localized Water Management Activities	3-221
3.7.2.2	Impacts to the Humboldt River	3-227
3.7.3	Monitoring and Mitigation	3-227
3.7.4	Residual Effects	3-227
3.7.5	Irreversible and Irrecoverable Commitment of Resources	3-227
3.8	Socioeconomics	3-228
3.9	Native American Religious Concerns	3-229
3.10	Environmental Justice	3-230
3.11	Relationship Between Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity	3-232
4.0	AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION	4-1
4.1	Air Quality	4-1
4.1.1	Affected Environment.....	4-1
4.1.2	Environmental Consequences	4-2
4.1.2.1	Proposed Action	4-2
4.1.2.2	No Action.....	4-2
4.2	Topography and Soils	4-2

CONTENTS (Cont'd)

4.2.1	Affected Environment.....	4-2
4.2.2	Environmental Consequences	4-2
4.2.2.1	Proposed Action	4-2
4.2.2.2	No Action.....	4-2
4.3	Water Resources.....	4-2
4.3.1	Affected Environment.....	4-2
4.3.2	Environmental Consequences	4-3
4.3.2.1	Proposed Action	4-3
4.3.2.2	No Action.....	4-3
4.4	Vegetation, Including Threatened, Endangered, Candidate, or Sensitive Species	4-3
4.4.1	Affected Environment.....	4-3
4.4.2	Environmental Consequences	4-3
4.4.2.1	Proposed Action	4-3
4.4.2.2	No Action.....	4-3
4.5	Wildlife and Aquatic Resources.....	4-3
4.5.1	Affected Environment.....	4-3
4.5.2	Environmental Consequences	4-5
4.5.2.1	Proposed Action	4-5
4.5.2.2	No Action.....	4-6
4.6	Threatened, Endangered, Candidate, or Sensitive Wildlife Species	4-6
4.6.1	Affected Environment.....	4-6
4.6.2	Environmental Consequences	4-6
4.6.2.1	Proposed Action	4-6
4.6.2.2	No Action.....	4-7
4.7	Grazing Management	4-7
4.7.1	Affected Environment.....	4-7
4.7.2	Environmental Consequences	4-7
4.7.2.1	Proposed Action	4-7
4.7.2.2	No Action.....	4-7
4.8	Access and Land Use	4-7
4.8.1	Affected Environment.....	4-7
4.8.2	Environmental Consequences	4-7
4.8.2.1	Proposed Action	4-7
4.8.2.2	No Action.....	4-8
4.9	Cultural Resources	4-8
4.9.1	Affected Environment.....	4-8
4.9.1.1	Cultural Resources Identified in the Project Area.....	4-8
4.9.1.2	Native American Concerns	4-8
4.9.2	Environmental Consequences	4-8
4.9.2.1	Proposed Action	4-8

CONTENTS (Cont'd)

4.9.2.2	No Action.....	4-9
4.10	Visual Resources	4-9
4.10.1	Affected Environment.....	4-9
4.10.2	Environmental Consequences	4-9
4.10.2.1	Proposed Action	4-9
4.10.2.2	No Action.....	4-9
4.11	Mitigation Measures.....	4-9
4.12	Residual Effects	4-10
4.13	Irreversible and Irretrievable Commitment of Resources	4-10
4.14	Relationship Between Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity	4-10
5.0	CUMULATIVE IMPACTS.....	5-1
5.1	Geology.....	5-1
5.1.1	Mine Dewatering and Localized Water Management Activities.....	5-1
5.1.2	Humboldt River	5-3
5.1.3	Proposed Action and No Action Alternative	5-3
5.2	Water Resources and Geochemistry	5-3
5.2.1	Mine Dewatering and Localized Water Management Activities.....	5-4
5.2.1.1	Impacts to Ground Water Levels	5-4
5.2.1.2	Impacts to Perennial Springs and Streams.....	5-9
5.2.1.3	Impacts to Ground Water Rights	5-9
5.2.1.4	Impacts to Surface Water Rights	5-9
5.2.1.5	Impacts to the Regional Ground Water Balance.....	5-9
5.2.2	Humboldt River	5-13
5.2.3	Proposed Action and No Action Alternative	5-19
5.3	Riparian Vegetation	5-19
5.3.1	Mine Dewatering and Localized Water Management Activities.....	5-19
5.3.1.1	Maggie Creek Watershed	5-20
5.3.1.2	Rock Creek Watershed	5-20
5.3.1.3	Susie Creek Watershed.....	5-20
5.3.1.4	Small Tributaries to the Humboldt River	5-20
5.3.1.5	Humboldt River.....	5-20
5.3.1.6	Isolated Springs and Seeps	5-20
5.3.2	Humboldt River	5-21
5.3.3	Proposed Action and No Action Alternative	5-22
5.4	Terrestrial Wildlife	5-22
5.4.1	Mine Dewatering and Localized Water Management Activities.....	5-22
5.4.2	Humboldt River	5-23
5.4.3	Proposed Action and No Action Alternative	5-24

CONTENTS (Cont'd)

5.5	Aquatic Resources	5-24
5.5.1	Mine Dewatering and Localized Water Management Activities	5-24
5.5.2	Humboldt River	5-25
5.5.3	Proposed Action and No Action Alternative	5-25
5.6	Threatened, Endangered, Candidate, and Sensitive Species	5-25
5.6.1	Terrestrial Species.....	5-25
5.6.2	Aquatic Species	5-28
5.7	Grazing Management	5-29
5.7.1	Mine Dewatering and Localized Water Management Activities	5-29
5.7.1.1	Twenty-five Allotment.....	5-30
5.7.1.2	T Lazy S Allotment.....	5-30
5.7.1.3	Hadley Allotment	5-30
5.7.1.4	Carlin Field Allotment	5-31
5.7.1.5	McKinley Allotment	5-31
5.7.1.6	Marys Mountain Allotment	5-31
5.7.2	Humboldt River	5-31
5.7.3	Proposed Action and No Action Alternative	5-31
5.8	Socioeconomics	5-31
5.8.1	Mine Dewatering and Localized Water Management Activities	5-32
5.8.1.1	Lowered Water Levels in Wells	5-32
5.8.1.2	Reduced Flow in Springs	5-32
5.8.1.3	Reduced Streamflow.....	5-33
5.8.1.4	Geology and Minerals	5-33
5.8.2	Humboldt River	5-33
5.8.2.1	Increased River Flow.....	5-33
5.8.2.2	Reduced River Flow.....	5-34
5.8.2.3	Water Quality Impacts	5-34
5.8.3	Proposed Action and No Action Alternative	5-34
5.9	Native American Religious Concerns.....	5-34
5.9.1	Impacts to Plants	5-35
5.9.2	Impacts to Animals	5-35
5.9.3	Impacts to Water	5-36
5.9.4	Impacts to Traditional Cultural Properties, Grave Sites, and Historic Sites.....	5-37
5.9.5	Impacts to Traditional Religious Practices and Cosmology	5-37
5.10	Cultural Resources	5-38
5.11	Air Quality	5-38
5.12	Topography and Soils	5-38
5.13	Access and Land Use	5-39
5.14	Visual Resources	5-39

CONTENTS (Cont'd)

6.0 CONSULTATION AND COORDINATION.....	6-1
6.1 Introduction	6-1
6.2 Implementation.....	6-1
6.3 Criteria and Methods by Which Public Input is Evaluated.....	6-2
6.4 Consultation with Others	6-2
6.5 Draft SEIS Review.....	6-3
7.0 LIST OF PREPARERS AND REVIEWERS	7-1
8.0 REFERENCES	8-1
GLOSSARY.....	G-1
INDEX.....	I-1
APPENDIX A - WATER RIGHTS	
APPENDIX B - WATER QUALITY	
APPENDIX C - HUMBOLDT RIVER INFORMATION	
APPENDIX D - SUMMARY OF THE BARRICK HYDROLOGIC MODEL	
APPENDIX E - WATERFOWL DATA	
APPENDIX F - AQUATIC RESOURCES TABLES	

LIST OF TABLES

1-1	Issues and Concerns Identified in Scoping.....	1-3
1-2	Permits Currently Authorized at the Goldstrike Mine.....	1-13
1-3	Goldstrike Property Mining Plans Through the Year 2004	1-16
1-4	Dewatering and Water Management Summary Table	1-29
1-5	Humboldt River Discharge Summary.....	1-31
2-1	Seed Mixture	2-3
3.1-1	Generalized Description of the Regional Geologic Map Units	3-7
3.1-2	Basin Characteristics	3-11
3.1-3	Effects of Geologic Events on Rock Properties	3-11
3.2-1	Major Subregions Within the Hydrologic Study Area	3-22
3.2-2	Mean Annual Precipitation (inches)	3-27
3.2-3	Summary of Hydrostratigraphic Unit Hydraulic Properties	3-28
3.2-4	Pre-1991 Estimated Ground Water Budget.....	3-35
3.2-5	General Flow Characteristics, Humboldt River Tributaries.....	3-40
3.2-6	Drinking Water Standards Applicable to Ground Water	3-47
3.2-7	Summary of Ground Water Chemistry by Hydrostratigraphic Unit.....	3-49
3.2-8	General Seasonal Irrigation Demand Estimates.....	3-59
3.2-9	Areas Upstream of Humboldt River Gages	3-62
3.2-10	Average Annual Humboldt River Flows	3-65
3.2-11	Average June Humboldt River Flows	3-65
3.2-12	Average September Humboldt River Flows.....	3-65
3.2-13	Mean Annual Humboldt River Gains and Losses	3-66
3.2-14	Mean October Gains and Losses in the Humboldt River	3-67
3.2-15	Historical Changes in Humboldt River Configuration	3-70
3.2-16	Humboldt River Channel Sinuosity Over Time, Dunphy to Mosel.....	3-70
3.2-17	Major Conveyance Structures Within the Humboldt River Study Area.....	3-74
3.2-18	Approximate Five-county Acreage with Humboldt River Water Rights, and Annually Decreed and Permitted Water on the Lower River	3-78
3.2-19	Water Quality Standards for the Humboldt River at Palisade and Woolsey Control Points..	3-79
3.2-20	Humboldt River Water Quality	3-80
3.2-21	Elevations of the Regional Ground Water System, Drawdown, and Mounding at Selected Timeframes	3-85
3.2-22	Springs Located Within or Near the Predicted Drawdown Area	3-93
3.2-23	Ground Water Rights and Application for Ground Water Rights Located Within the Predicted Drawdown Area.....	3-104
3.2-24	Surface Water Rights Located Within the Predicted Drawdown Area.....	3-107
3.2-25	Median Predicted Betze-Post Pit Lake Chemical Concentrations.....	3-114
3.2-26	Modeled Maximum Goldstrike Mine Discharges to the Humboldt River.....	3-120

LIST OF TABLES (Cont'd)

3.2-27	Potential Changes in River Stages from Projected Maximum Goldstrike Mine Discharges	3-125
3.3-1	Acres of Riparian and Wetland Vegetation in the Study Area.....	3-143
3.3-2	Wetland and Riparian Vegetation Types and Dominant Species in the Study Area	3-147
3.3-3	Vegetation Associated with Seeps and Springs	3-151
3.4-1	Highest (from 10 to 233 years) Median Pit Lake Water Concentrations and Benchmark NOAELs for Water Ingestion	3-177
3.4-2	Surface Water, Sediment, and Tissue Concentrations of Constituents of Concern from Humboldt Lake (1987-1990)	3-181
3.4-3	Mean Surface Water Concentrations Measured in Humboldt Lake and Threshold Effects Levels from the Literature	3-183
3.4-4	Mean Tissue Concentrations Measured in Organisms Collected in Humboldt Lake and Threshold Effects Levels from the Literature	3-183
3.4-5	NOAELs from Laboratory Studies Used to Estimate Risks to Wildlife.....	3-185
3.4-6	Estimated Concentrations of Select Constituents in Water Entering the Humboldt Sink....	3-186
3.6-1	Special Status Species Identified for the Betze Project Supplemental EIS.....	3-197
3.6-2	Estimated Miles of Occupied LCT Habitat in the Maggie Creek and Rock Creek Subbasins.....	3-203
3.6-3	Mean LCT Abundance (number/mile) in the Beaver Creek Drainage, 1994	3-206
3.6-4	Summary of LCT Densities in Maggie Creek Tributaries, 1997	3-206
3.6-5	LCT Densities for Rock Creek Subbasin Tributaries.....	3-207
3.7-1	Grazing Allotments in the Study Area	3-219
3-7.2	Water-related Range Improvements Within the 10-foot Drawdown Contour	3-225
5-1	Summary of Springs Within the Predicted Cumulative Drawdown Area	5-10
5-2	Summary of Ground Water Rights Within the Cumulative Drawdown Area	5-10
5-3	Summary of Surface Water Rights Within the Cumulative Drawdown Area.....	5-12
5-4	Projected Maximum Decreases in Humboldt River Flow Resulting from Cumulative Drawdown.....	5-19

LIST OF FIGURES

1-1	General Location Map	1-11
1-2	Surface Management Status	1-12
1-3	Goldstrike Property Facilities	1-14
1-4	Water Operations Components.....	1-19
1-5	Recent Springs and Associated Wetlands.....	1-21
1-6	Basin Boundaries and Humboldt River Features	1-33
2-1	Proposed Action – Buried Pipeline Location.....	2-2
3.1-1	Regional Topographic Map.....	3-4
3.1-2	Regional Geologic Map	3-5
3.1-3	Regional Geologic Cross Sections.....	3-6
3.1-4	Project Area Geologic Map.....	3-9
3.1-5	Quaternary Faults in Nevada	3-12
3.1-6	Quaternary Faults and Seismic Events	3-13
3.1-7	Block Diagrams of Sinkhole Development.....	3-15
3.1-8	Solution and Fracture Features Identified as of December 1998	3-17
3.1-9	Areas Potentially Susceptible to Sinkhole Development	3-19
3.2-1	Hydrologic Study Area for Mine Dewatering and Localized Water Management Activities	3-23
3.2-2	Relation of Mean Annual Precipitation to Altitude	3-24
3.2-3	Average Monthly Precipitation at Elko and Battle Mountain	3-25
3.2-4	Annual Precipitation at Elko and Battle Mountain.....	3-26
3.2-5	Major Hydrostructural Features.....	3-31
3.2-6	Hydrogeologic Cross Section Through Ranch Dam and Betze-Post Pit	3-32
3.2-7	Unconfined Ground Water Levels, 1990-1991	3-34
3.2-8	Ground Water Rights, Application for Ground Water Rights and Other Known Wells in the Hydrologic Study Area	3-37
3.2-9	Areas of Perennial Stream Reaches, Springs, and Seeps in the Hydrologic Study Area..	3-38
3.2-10	Streamflow Measurement Sites, Humboldt River Tributaries.....	3-41
3.2-11	Surface Water Rights, and Application for Surface Water Rights in the Hydrologic Study Area.....	3-46
3.2-12	Selected Regional Water Quality Monitoring Wells	3-48
3.2-13	Piper Trilinear Diagram of Baseline Ground Water Chemistry.....	3-51
3.2-14	Stream Classification for Beneficial Uses and Associated Standards	3-55
3.2-15	Stream Sampling Sites with Summarized Water Quality Data.....	3-56
3.2-16	Rye Patch and Pitt-Taylor Reservoirs	3-60
3.2-17	Long-Term Average Annual Streamflows for the Humboldt River at USGS Gage Stations	3-64
3.2-18	Humboldt River Sediment Discharges.....	3-68

LIST OF FIGURES (CONT'D)

3.2-19	Historic Channel Migration Along a Portion of the Humboldt River	3-73
3.2-20	Humboldt and Carson Sinks Area.....	3-76
3.2-21	Barrick Pumping Rate	3-83
3.2-22	Drawdown and Mounding, End of 1998	3-84
3.2-23	Predicted Drawdown at End of Mining	3-87
3.2-24	Predicted Drawdown at 50 Years Postmining	3-88
3.2-25	Predicted Drawdown at 100 Years Postmining	3-89
3.2-26	Predicted Drawdown at Recovery.....	3-90
3.2-27	1998 Drawdown Relative to Annual Spring and Stream Monitoring Sites	3-92
3.2-28	Boulder Valley Spring Flow Areas	3-99
3.2-29	Potentially Impacted Perennial Waters Within the 10-foot Drawdown Area.....	3-101
3.2-30	Potential Drawdown Impacts to Ground Water Rights, Application for Ground Water Rights, and Other Known Wells	3-103
3.2-31	Potential Drawdown Impacts to Surface Water Rights and Application for Surface Water Rights	3-106
3.2-32	Total Dissolved Solids and Dissolved Arsenic Over Time for the New Springs in Boulder Valley	3-109
3.2-33	Estimated Final Betze-Post Pit Lake	3-112
3.2-34	Betze-Post Pit Lake Trends in Median Predicted Chemical Concentrations.....	3-115
3.2-35	Goldstrike Mine Discharges to the Humboldt River	3-117
3.2-36	Projected Changes to Flows at Battle Mountain	3-122
3.2-37	Projected Changes to Flows at Comus	3-123
3.2-38	Estimated Average Annual Premine Loads at the Carlin and Rye Patch Gages	3-130
3.2-39	Potential Maximum Increases in Annual Loads of TDS and Arsenic at the Rye Patch Gage.....	3-132
3.2-40	Potential Maximum Increases in Annual Loads of Boron and Fluoride at the Rye Patch Gage.....	3-133
3.2-41	Potential Maximum Increases in Annual Loads of Copper and Zinc at the Rye Patch Gage.....	3-134
3.2-42	Total Potential Increase in Loads During the Mine Discharge Period (1997-2011) at Rye Patch Gage.....	3-135
3.2-43	Comparison of Average Annual Loads at Rye Patch Gage vs. Humboldt Sink (Premine Discharge)	3-137
3.2-44	Total Potential Increase in Loads During the Mine Discharge Period at the Humboldt Sink.....	3-138
3.3-1	Riparian Areas in the Hydrologic Study Area.....	3-146
3.3-2	Riparian Areas Potentially Affected by Drawdown	3-155
3.4-1	Mule Deer Designated Seasonal Ranges.....	3-163
3.4-2	Pronghorn Designated Seasonal Ranges	3-165

LIST OF FIGURES (CONT'D)

3.4-3	California Bighorn Sheep Designated Range	3-166
3.6-1	Current Distribution of Lahontan Cutthroat Trout	3-204
3.6.2	Known Locations for Springsnail Populations and Spotted Frog Habitat.....	3-209
3.7-1	Grazing Allotments and Pastures.....	3-222
3.7-2	Grazing Allotments and Water-related Range Improvements.....	3-223
3.7-3	Perennial Waters Within Grazing Allotments Potentially Affected by Drawdown	3-224
4-1	Proposed Action - Right-of-Way Location.....	4-4
5-1	Areas Potentially Susceptible to Sinkhole Development	5-2
5-2	Current Drawdown and Mounding (End of 1998)	5-5
5-3	Predicted Maximum Extent of the Cumulative 10-Foot Drawdown Contour	5-7
5-4	Comparison of the Predicted Goldstrike Mine Drawdown Area and the Cumulative Drawdown Area	5-8
5-5	Potentially Impacted Perennial Waters Within the Cumulative Drawdown Area	5-11
5-6	Cumulative Mining Discharges to the Humboldt River	5-14
5-7	Projected Changes to Flows at Battle Mountain	5-15
5-8	Projected Changes to Flows at Comus	5-16
5-9	Potential Cumulative Increase in Loads During the Mine Discharge Period at the Humboldt Sink.....	5-18

UNIT CONVERSION TABLE

From	To	Multiply By
Area		
acres	square feet	43,560
square miles	acres	640
Volume		
acre-feet	gallons	325,829
gallons	cubic feet	7.48
Flow		
cubic feet per second (cfs)	gallons per minute (gpm)	449
gpm	acre-feet per year	1.61
cfs	acre-feet per year	724
Concentration		
parts per million (ppm)	milligrams per liter (mg/L)	1
mg/L	micrograms per liter (μ g/L)	1000
Loads		
tons per day (tpd)	tons per year (tpy)	365
tpy	pounds per day	5.48

ACRONYMS AND ABBREVIATIONS

°F	Fahrenheit
µg/g	micrograms per gram
µg/L	micrograms per liter
ALNINC	<i>Alnus incana</i>
amsl	above mean sea level
ANFO	ammonium nitrate fuel oil
AUM	animal unit month
BLM	Bureau of Land Management
BVMP	Boulder Valley Monitoring Plan
bw	body weight
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIA	Cumulative Impact Analysis
CO	carbon monoxide
CTQ	Community Tolerance Quotient
EIS	environmental impact statement
ELLCO	Elko Land and Livestock Company
EPA	Environmental Protection Agency
ET	evapotranspiration
FFR	Fenced Federal Range
FLPMA	Federal Land Policy and Management Act of 1976
gpm	gallons per minute
H ₂ S	hydrogen sulfide
LCT	Lahonton cutthroat trout
LMC	Lower Maggie Creek
LOAEL	Lowest Observed Adverse Effects Levels
m ²	square meters
MCBMP	Maggie Creek Basin Monitoring Plan
MCWRP	Maggie Creek Watershed Restoration Project
mg/kg	milligrams/kilograms
mg/L	milligrams per liter
Na	sodium
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NaCl	sodium chloride
NDCNR	Nevada Department of Conservation and Natural Resources
NDEP	Nevada Department of Environmental Protection
NDOW	Nevada Division of Wildlife
NDWR	Nevada Department of Water Resources
NEPA	National Environmental Policy Act
NNHP	Nevada Natural Heritage Program

NO ₂	oxides of nitrogen
NOAA	National Oceanographic and Atmospheric Administration
NOAEL	No Observed Adverse Effects Levels
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NTU	nephelometric turbidity units
OHWM	ordinary high water mark
PM ₁₀	particulate matter with an aerodynamic diameter of 10 microns or less
ROW	right-of-way
RTi	Riverside Technology, inc.
SAR	sodium adsorption ratio
SHPO	State Historic Preservation Officer
SO ₂	sulfur dioxide
SO ₄	sulfate
SOAP	South Operations Area Project
SOAPA	South Operations Area Project Amendment
TDS	total dissolved solids
TSS	total suspended solids
UIC	underground injection control (permit)
USCOE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRM	Visual Resource Management
WMA	Wildlife Management Area